

# SAFETY REVIEW OF RESEARCH REACTOR FACILITIES (RER/9/058) H4 New

## MODEL PROJECT

### CORE FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc. Comp.	TOTAL
	m/d	US \$	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	
1999	4/6	61,740	0	20,000	2/0	6,900	0/0	0	109,760	0	0	198,400
2000	0/21	10,815	72,000	0	2/0	7,200	0/7	2,660	93,730	0	0	186,405
2001	4/20	75,600	0	10,000	1/0	3,750	0/0	0	120,960	0	0	210,310
2002	2/10	39,550	0	10,000	1/0	3,900	0/0	0	51,415	0	0	104,865

### FOOTNOTE a/ FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc. Comp.	TOTAL
	m/d	US \$	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	
1999	0/0	0	0	60,000	1/0	3,450	0/0	0	0	0	0	63,450
2000	4/6	68,040	0	60,000	0/0	0	0/0	0	120,960	0	0	249,000
2001	0/0	0	90,000	65,000	2/0	7,500	0/7	2,800	0	0	0	165,300
2002	4/0	70,800	80,000	10,000	0/0	0	0/0	0	66,080	0	0	226,880

First Year Approved: 1999

**OBJECTIVES:** To enhance the general safety of ageing research reactor facilities and spent fuel storage in the region, thereby reducing the risk of accident and improving security; to correct shortcomings in prioritized institutions through appropriate training and guidance, and provision of limited monitoring equipment in chronic cases; to develop generic long term measures for achieving an improvement in safety, security and exploitation of all research reactors in the region and create a communal safety culture. Target country priority selection criteria: (i) research reactors shut down for >1 year with no decommissioning and decontamination (D&D) plans (ii) research reactors with major spent fuel storage problems or with leaking fuel assemblies (iii) research reactors still operating which were commissioned > 30 years ago.

**BACKGROUND:** A serious, widespread and dangerously unsafe situation exists and is further developing due to ageing problems in numerous research reactor facilities in many Member States. For many, future planning is ill-defined while effective utilization is increasingly less viable in this mature field. These reactors, either operating or shut down, face extensive refurbishment or alternatively, extended shutdown or D&D in order to meet the safety standards demanded of the nuclear industry. Many such facilities have extensive stocks of spent fuel with no current disposal opportunities. Fuel corrosion and leakage is a well recorded aspect of such ageing materials, leading to potentially serious contamination consequences with associated safety considerations. Commercialization is extremely difficult to achieve and financial and budgetary constraints limit available options. Several countries have requested assistance in identifying future options, ranging from refurbishment, renovation and enhanced utilization to closure, D&D and final dismantlement. Facilities which have suffered extended shutdown and are slated for re-operation present a major risk factor unless they are recommissioned, involving detailed inspections of the reactor vessel, core, structural components, partially irradiated fuel and associated equipment prior to their being restarted. Facilities shut down without close surveillance represent a second major area of concern, where corrosion and unattended ageing invariably lead to complications with the possibility of incidents. Finally, operating systems without a full and up-to-date safety and QA culture are a potential high accident risk. The absence of strong regulatory bodies exercising supervision and control is a widespread problem which has some clear generic features, allowing communal activities to be applied to solving it, thereby reducing the currently growing risk. This regional project will provide a precursor pilot assessment to identify the critical issues for specific priority facilities and find generic long term solutions which should ensure the safety of all such facilities.

**PROJECT PLAN:** A needs assessment and initial characterization of the relevant situations will be provided by existing background knowledge and counterpart submissions in response to a questionnaire, followed by INSARR and IFMAP type missions to the research reactor facilities that have indicated the greatest need. Candidate selection will depend on operational state, extent of effective utilization, fuel storage situations, general radiation safety considerations and financial constraints. Participation will be carefully phased, mission evaluations providing the basis for the development of several generic options on which to build solutions and approach future cases interregionally. In each case, a strategy will be developed for achieving an acceptable level of operational security and environmental safety. The initial stage and first phase will be core funded and will aim at achieving maximum return of improvement in terms of safety, risk reduction and benefit versus cost. A second phase will extend generic solutions combined with action plans for further improvement in safety in the region as a whole. A few local research reactor centres and associated experts will be identified through the survey questionnaire to act as reference facilities and provide assistance appropriate to the needs of the specific facilities addressed in this project. A

regional community sharing an enhanced safety culture will develop. This regional project must be co-ordinated with associated national TC projects. Although directed currently to the European region, it will also consider urgent cases in other regions provided additional funds are found.

**NATIONAL COMMITMENT:** The explicit commitment of a government to support participation fully and the submission of a counterpart report are essential initial requirements for participation. A clear statement concerning the short term situation as well as the long term strategy for the research reactor facility is essential. Clarity of strategy will play a dominant part in structuring the participation and assistance to be provided, ranging from clearly defined enhanced utilization, with end users specified, to shutdown and D&D. For spent fuel management, commitment has to be made to act on the missions' recommendations for safe storage and final disposal. Governments will provide the staff, resources and infrastructure for the project activities from their national institutions and regulatory bodies.

**AGENCY INPUT:** The Agency will co-ordinate the programme and provide high level but limited technical support. It will rely extensively on the needs assessment from the INSARR and IFMAP style missions. Also, the Agency will support training courses and workshops, and provide continuous evaluation and recommendations, reflecting the Agency standards required of such facilities and extensive in-house experience. Limited equipment will be supplied to address chronically unsafe situations, and scientific visits and fellowships will be used selectively. Agency commitment will be increased depending on the extent of donor funding for the footnote a/ component.

**PROJECT IMPACT:** Contingent on the survey and needs assessment results, impact will include: (i) short term safety enhancement in several selected research reactor facilities, alleviating immediate chronically insecure situations with low level remedial action, combined with training in the comprehensive safety culture demanded of each such institution; (ii) the development of a strategic plan for each facility to allow optimal activities to be undertaken for enhanced safety; (iii) the installation of a fuel management plan in each facility to address safety issues in spent fuel handling, storage, and ultimate disposal; (iv) where a reactor is operating efficiently and safely, effective utilization will be supported and enhanced. Such facilities and their staff will act as local representatives and as model facilities on which to base acceptable safety standards in the region. Synergies should thereby be developed. (v) assistance with decommissioning in cases where this is the approved strategy. The overall impact will be the enhancement of the safety culture and visibly improved safety of operation and utilization. In specific cases, assistance will be provided in the closure of unsafe research reactor facilities through decommissioning, with the safe storage or disposal of spent fuel specifically addressed.